Learning in and out of university: Aboriginal and Torres Strait Islander students' conceptions and strategies used to learn[1]

Lynn Wilss, Gillian Boulton-Lewis
Queensland University of Technology
Ference Marton
Gothenburg University, Sweden
David Lewis
University of Queensland

Research suggests that students' approaches to learning and learning outcomes are closely related to their conceptions of learning. This paper describes a phenomenographically inspired investigation into conceptions of formal learning held by 22 Aboriginal and Torres Strait Islander students from three Australian universities in Queensland; experiences of informal learning, reasons for studying and strategies used to learn were also investigated. The attrition rate for these students in tertiary education is higher than that of any other group of students. It was hoped that information gained may delineate factors that contribute to high attrition rates and therefore inform courses of action that may lead to improved teaching and learning practices for these students. Additionally, success in tertiary education for Aboriginal and Torres Strait Islander students may increase their involvement in mainstream society. Results showed that they view and approach university learning in much the same way as other university students. It was also apparent that, generally, the strategies these students used did not match the conceptions of learning they held. An interesting result was the difference between the conceptions of formal learning and explanations of informal learning.

Conceptions of learning

In recent years there has been increased interest in learning from the learner's perspective and there is evidence that conceptions of and approaches to learning, as well as learning outcomes, are functionally related (Marton, Dall'Alba, & Beaty, 1993; Watkins, 1996). Conceptions of learning have been investigated since the late 1970's when Säljö (1979) developed five conceptions of academic learning. More recently Marton, Dall'Alba and Beaty (1993) investigated conceptions of learning with students at Britain's Open University and found six distinctively different ways of experiencing learning: A. increasing one's knowledge, B. memorising, C. applying, D. understanding, E. seeing something in a different way, and F. changing as a person. According to Marton et al. these conceptions form a hierarchy with the first three focusing on quantitative dimensions of learning while the latter three are characteristically qualitative and focus on the role of meaning in learning. Essentially the six conceptions depict learning as moving from reproduction of material, which reflects a surface approach, to transforming content as is evident in a deep approach. Understanding which is associated with a deep approach, was investigated with British university students by Entwistle and Entwistle (1992). Students discussed understanding in terms of it breadth, depth and structure and described it as a feeling of satisfaction, deriving meaning and significance of material learnt, and being confident about explaining what they understood. To gain understanding students stated they actively discussed and debated meaning with other students or worked out a structure to learn material.

Some studies outside Western communities have found conceptions of learning that are similar to Marton et al.'s (1993). For example Watkins and Akande (1994) conducted a

[1] This research is part of a study funded in 1997-1999 by an ARC Large Grant.

study with 14 to 16 year old Nigerian students and found categories of descriptions of learning that paralleled the first four conceptions. It may seem feasible to surmise that all learners, regardless of culture, would hold similar conceptions of formal learning. However Triandis (1972) warned against such assumptions, believing that concepts from one culture should not be imposed onto another. In studies outside the Western European context it has been noted that different cultures emphasize different aspects of learning. Wen and Marton (1993), for example, found Chinese learners do not see memorisation and understanding as opposites but rather as being necessary parts of learning with an important distinction being made between memorisation with and without understanding.

Most research into conceptions of learning has focused on formal learning situations. However some studies have found that instruction in educational settings is not the only force that influences how students learn or how they perceive learning (Resnick, 1991). For example Resnick (1991) maintains that our everyday lives are filled with constructive learning processes such as asking questions, elaborating, and reasoning. She added that cultural transmission also occurred by informal mechanisms. Informal learning is depicted as "natural learning" by Heath (1991) who defines it as "that which takes place without the specific designation of teacher and student and outside the framework of a curriculum established by parties beyond both student and teacher" (p. 102). She views this as related to everyday activities such as solving problems and creating meaning through reasoning analogically. Ninnes (1996) proposed that each culture has its own informal learning system that incorporates strategies, contexts and content which students bring to formal learning environments. He added that interaction between informal and formal learning systems affects classroom behaviour, including strategies used to learn, and outcomes of formal learning.

Learning strategies

Students' reasons for learning as well as their perceptions of the learning environment underlie the approach they use to learn (Beaty, Gibbs, & Morgan, 1997). Weinstein and MacDonald (1986) described learning strategies as any cognitive, affective, or behavioural activity that may assist in the processes of encoding, storing, retrieving, or using knowledge. Categories of learning strategies have been proposed as including rehearsal, organisation, elaboration, and comprehension monitoring (Weinstein & Mayer, 1983). The relationship between teaching and learning was examined by Vermunt and Verloop (1999) who described learning activities according to three categories: cognitive, affective, and metacognitive. Cognitive activities were explained as leading to changes in a student's knowledge base and included relating/structuring, analysing, memorising and processing critically. Metacognitive activities incorporated both cognitive and affective components and are carried out by orienting or preparing a learning process by examining content and processing activities as well as prior knowledge; adjusting the original learning plan through continual monitoring; and evaluating and reflecting by trying to explain course work in one's own words, answering questions from fellow students, and thinking about learning experiences in general. It has been suggested that cultural factors influence the strategies that a student uses (Hatano & Miyake, 1991; Ninnes, 1996); cultural determinants of learning, including strategies, are discussed below.

Cultural influences on learning

Hatano and Miyake (1991) propose that culture holds implications for learning, both institutionally and informally while Ninnes (1996) maintains that all people, regardless of culture, perform basic cognitive activities such as remembering, forming concepts, and reasoning logically. However he adds that cultural factors could influence learning in formal situations as people from different cultures may exhibit different learning behaviours or use different learning strategies. Further to that each culture has its own informal learning system, comprising strategies, contexts and content and students bring this to the formal learning environment. Ninnes noted that Melanesians in Western Province, Solomon Islands base their informal learning on kin relationships that involve respect for elders, learning from parents, grandparents, and others, and maintenance of cultural goals of the group. Learning also occurred by observation, imitation, participation, and trial and error. Bourke et al. (1996) maintain that university courses in Australia do not give consideration to cultural differences in content or learning style, yet much research has been undertaken into learning and Aboriginal children (Christie, 1985; Harris, 1984) and aspects of Aboriginal culture are well documented.

Learning and Aboriginal and Torres Strait Islander students

Australian Aboriginality is determined according to descent or origin, self-identification, and community acceptance and is defined as "A person of Aboriginal or Islander descent who identifies as an Aboriginal or Islander and is accepted as such by the community with which he is associated" (Australian Bureau of Statistics and Australian Institute of Health and Welfare, 1996, p. 61). Research into learning by Aboriginal children found that they have superior skill in spatial and visual recall (Kearins, 1981), they are more likely to process information simultaneously rather than successively (Klich & Davidson, 1984), they learn by observation and trial and error rather than by direct instruction (Christie, 1985) and Aboriginal children have the same capacity to process information as other Australian children (Boulton-Lewis, Neill & Halford, 1986, 1987). Most of the preceding research was undertaken with non-urban Aboriginal children. Research into learning by Aboriginal students in post secondary education is somewhat limited.

There is a collection of articles in Harvey and McGinty (1988) which includes statements by Aboriginal adults about their learning and what has affected it, and more theoretical articles as follows. Davidson and Freebody (1986) found many Aboriginal teacher trainees were novices metacognitively and according to Nugent (1992) Aboriginal tertiary students often had bad experiences in education which affected their self concept. Nugent also reported that they did not see lack of prerequisite knowledge as a barrier to learning and were more interested if knowledge seemed to be immediately necessary. A study conducted by Hughes (1987) described Aboriginal cultural influences on learning as they contrasted with expectations of Australian education systems. In summary he found that Aboriginal students possessed a group attitude which conflicts with the individuality that is apparent in Australian education systems and that Aboriginal learning is usually spontaneous and relies on repetition and listening as opposed to formal learning which requires structure, inquiry and verbalising. It is reasonable to argue that these factors may contribute to attrition rates of Aboriginal students in higher education which are more than twice those for other students (36.4:14.4, 1992; 33.5:14.3, 1993) (Queensland University of Technology, 1995). Bourke et al. (1996) proposed that this may be due to the lack of culturally informed curricula, less educational experience by these students, and language problems for those who had English as a second language.

Boulton-Lewis, Marton and Lewis (1997) undertook a pilot study into Aboriginal university students' conceptions of learning and found these students had similar conceptions of and approaches to learning as most other university students. They mostly held quantitative conceptions of learning, they used repetitive and reproductive strategies, and most stated that learning was acquiring information and understanding was trying to make sense of it. In some students a moral dimension to learning was apparent as evidenced by their reason for learning that was to help their people. This reason for studying may be culture specific as an investigation conducted by Beaty, Gibbs and Morgan (1997) with British Open University students found four orientations to study that did not include a moral dimension. They were academic which focussed on academic goals; vocational where the aim was to gain employment; personal, involving self development; and social which related to social aspects of college life.

Rationale for the study

The intention of this research was to interview Aboriginal and Torres Strait Island students engaged in higher education to determine (a) their reasons for studying, (b) their conceptions of formal learning and perceptions of informal learning, and (c) the strategies they use to learn. An assumption was that if Aboriginal and Torres Strait Islander students hold conceptions of learning that are different from mainstream students this may cause conflict in their learning which may contribute to the high attrition rates. Formal and informal learning are defined in Christie's (1985) terms; formal learning is all classroom or institutional learning, whether based on conservative or progressive philosophy and informal learning is education in the community in the absence of professional teachers.

Methodology

Sample and interview procedure

Fourteen male and 8 female Aboriginal and Torres Strait Islander students participated. They were enrolled in first year Bachelor degree courses in business, social science, humanities, and science in three Australian universities in Queensland. Students' ages ranged from 18 to 48 years; the mean age was approximately 25 years. Three students came from remote areas such as Thursday Island (students 8, 9, 21), 11 were from regional country towns (students 1, 2, 4, 5, 6, 10, 12, 14, 15, 17, 22) and eight were from capital cities (students 3, 7, 11, 13, 16, 18, 19, 20). Sixteen students had completed Year 12; the others had completed Year 10. Individual semi-structured audiotaped interviews, each lasting about an hour, were conducted by two Aboriginal research assistants in conjunction with the first researcher.[2] Predetermined questions were used to stimulate dialogue and further questions. Topics included: reasons for studying at university; methods of studying; the meaning of learning, understanding, and knowledge; learning outside university; and memorisation and learning.

Analysis

Interviews were transcribed from the audiotapes and analysed jointly by the four researchers using a phenomenographically inspired approach (Marton, 1994). This

[2] We acknowledge the substantial contribution to the research made by Gary Wallace and Barry Malezer in this respect. We also thank Carol Bond for her involvement.

approach was adopted as it seeks to identify the different ways in which people conceive of and understand phenomena. Conceptions that are depicted are explained as being relational as people's experiences are influenced by their intentions and the context in which phenomena occur (Johansson, Marton & Svensson, 1985). Interview transcripts were summarised initially as a series of brief case studies which focused on reasons for studying, formal learning, informal learning, understanding, strategies, knowledge, the relationship between learning and understanding and other relevant issues. The data were pooled and mutually exclusive conceptions were derived for formal learning. Students were then allocated to the conceptions that were most typical for them. Other interesting issues including categories of informal learning, strategies used to learn, and reasons for studying were also identified. In explaining phenomenographic research Marton (1994) maintains that categories of description that become apparent form a hierarchical system. It should be noted that this is evident in the categories for formal learning. Following are descriptions of each conception of formal learning and categories that describe students' experiences of informal learning, their reasons for studying and the strategies they used in formal learning situations. Interview extracts of students' statements exemplify each conception and the student number that was allocated to the student is cited.

Results

Reasons for studying at university

Students gave three main reasons for undertaking their course of study: (1) *paying for study*, two students (1, 4) stated they were paying for their education and this was motivating their study; (2) *Indigenous issues*, eight students (4, 5, 7, 11, 15, 16, 21, 22) believed that undertaking study would enable them to improve conditions for indigenous people through leading by example or preparing them to work with their own people in their community; and (3) *personal development*, which was expressed in three ways: (3A) *job related* (students 1, 3, 6, 11, 12, 19, 20), that is wanting to improve their job and thereby possibly their living conditions; (3B) *to pursue further learning/knowledge*, six students (2, 8, 10, 13, 14, 20) reported that their current course was a stepping stone to further study, gaining the qualification, or gaining knowledge; and (3C) two students (9, 17) felt that by studying they would *improve as a person*.

Conceptions of formal learning

Conceptions of formal learning, illustrative student statements and the most typical conception for each student are summarised in Table 1. Three main conceptions were evident: (1) *acquiring knowledge*, (2) *understanding*, and (3) *personal growth*. *Acquiring knowledge* was explained in quantitative terms as accumulation of information or knowledge which may or may not result in its use. As such, this conception was defined into two sub-categories: (1A) *increasing one's knowledge* (one student) and (1B) *using knowledge* (three students). Sixteen students explained learning as a process of *understanding*. Three sub-categories of understanding were apparent: (2A) *Understanding and acquisition*, nine students explained learning as acquisition through memorisation then understanding what was remembered; (2B) *understanding, acquisition and use*, two students stated this meant being able to move on to the next section of work or use what was understood in a practical sense; and (2C) *understanding, relating, elaborating and analysing*, five students indicated that they were interacting with information by relating it to relevant things or experiences. Some stated that elaborating and breaking information down also led to understanding.

Learning as *personal growth* was expressed by two students as improving as a person, relating their learning to life experiences, or feeling good about themselves.

Table 1. Conceptions of formal learning by student and student examples

Formal Learning Conceptions		Examples of Students' Responses	Students
1. Acquiring Knowledge			
1A	Acquisition - Increasing Knowledge	Trying to learn things and trying to get it into your head. Just getting more knowledge of things you don't know and what's interesting or in the outside world. (4)	4
1B	Acquisition - Using Knowledge	A process of taking in knowledge and outputting it into your words for assignments or tests or whatever. (17)	14, 17, 18
2. Understanding			
2A	Understanding-Acquisition	Learning is information. Remembering things that are important. You are learning and you've got to understand what you are learning. (11)	1, 8, 11, 12, 13, 19, 20, 21, 22
2B	Understanding-Acquisition and Use	Learning is a series of stepping stones. Unless you've got the basic understanding of an idea, you're not going to be able to take that to the next step which is more information then after that use of that information. (5)	5, 7
2C	Understanding-Relating, Elaborating, Analysing	You are learning because you are relating it to relevant things relearning; Taking it in, knowing what you're knowing, learning what you don't know, building on both so you've got a good foundation; relate back to reality, to experiences. (15)	2, 3, 6, 15, 16
3. Personal Growth		It's [learning] going to benefit you. Trying to gather knowledge that is going to help you within the future. . . learning means a better future for me . . . you're going to take something away with you that's going to help you for the rest of your life. Like get you somewhere in life, have it within you, make you feel good inside. (10)	9, 10

Categories of informal learning

Categories of informal learning, illustrative student statements, and the most typical category for each student are summarised in Table 2. Four main categories emerged: (1) *acquiring skills by observation and imitation*, six students stated that they used observation to learn from other people or about objects and for some once observation had taken place a particular skill could be imitated (2) *acquiring cultural and social knowledge by transmission of information from family members or elders*, five students expressed a respect for Aboriginal elders or family members and stated that a lot could be learnt from them; (3) *independently developing practical skills by active problem solving*, trial and error and life experiences were the basis for informal learning for five students (4) and *independently seeking information in areas of interest by finding appropriate resources*, interest provided motivation to go and find out about something by reading in books or talking to experienced people for four students.

Table 2. Categories of informal learning by student and student examples

	Categories of informal learning	Examples of students' responses	Students
1	Acquiring skills by observation sometimes imitation	I've learnt how to throw a cast net, you see people do it all the time and think 'How come it comes out so nicely?' so you sit, play around with your body to see how, then go and do it before you can learn how to do it yourself. (8)	4, 6, 8, 10, 12, 14, 15, 17
2	Acquiring cultural and social knowledge by transmission of information from family members or tribal elders	How do I learn outside uni? Listen to others. Usually I listen to elders or female elders . . . if it's something to do with cultural issues I will go up and ask an Aunty. (7)	7, 9, 16, 21, 22
3	Independently developing practical skills by active problem solving	*How did you go about learning computers? B*y playing around with them. That's how I learn a lot of things, just by playing around with them, trial and error, experience. (2)	1, 2, 5 , 13, 19
4	Independently seeking information in areas of interest by finding appropriate resources	Say fishing is a hobby you are really interested in. You find it a lot easier because it's a hobby just to remember the names of the fish and things associated with it. *How would you say you go about learning fishing?(Interviewer)* Reading books and talking to people that are very experienced in it. (3)	3, 11, 18, 20

Strategies used for formal learning

Students reported using six main modes of learning: *listening*, *reading*, *writing*, *visual imagery*, *thinking or relating*, and *discussing* information. Within each mode are hierarchical categories of strategies that indicate an increasing degree of cognitive effort. At the lowest level, that is *focusing/rehearsal,* students employed strategies such as listening, denoting areas of text that were important by highlighting, or developing written points and practising rehearsal strategies that included going over information repeatedly. At the next level, *organisation/memory* strategies, it is apparent that students purposefully manipulated information and often this was carried out to assist memorisation. Thus rather than just writing notes or repeating them over and over, students stated that they summarised information or broke it down, and rather than simply looking at a picture they organised information in diagrams. Reading strategies were also reported in terms of reorganising information to assist memorisation. The third category of strategies, *elaboration/monitoring*, is indicative of students seeking understanding. These strategies show that students often changed information for example by thinking about it and adjusting it to their level by putting it in words they understood. For some students relating what they learnt to real-life situations helped in the process of understanding. Monitoring learning was achieved by students asking themselves questions, reading again to check understanding, and discussing information with others.

Relationships between formal learning, informal learning, and learning strategies

Table 3 summarises students' conceptions of formal learning, strategies used, and categories of informal learning. As recent research into learning includes the premise that conceptions of learning influence the strategies students use (Marton et al., 1993; Watkins, 1996) in this section we analyse the conceptions of formal learning for the students of this study and the strategies they reported using. Conceptions of formal

learning and categories of informal learning will also be compared and contrasted to reveal continuities and discontinuities of learning in both situations as learning is not specific to educational contexts (Heath, 1991; Resnick, 1991).

Table 3. Conceptions of formal learning, informal learning, and strategies

Student	Formal learning conceptions	Informal learning categories	Learning strategies
1	Understand/acquire	Independent, active, problem solving	Focusing/Rehearsal
2	Understand/relate, elaborate, analyse	Independent, active, problem solving	Focusing/Rehearsal
3	Understand/relate, elaborate, analyse	Seeking information in areas of interest	Elaboration/Monitoring
4	Acquisition/increase knowledge	Acquire skills observation/imitation	Focusing/Rehearsal
5	Understand/acquire and use	Independent, active, problem solving	Organisation/Memory
6	Understand/relate, elaborate, analyse	Acquire skills observation/ imitation	Elaboration/Monitoring
7	Understand/acquire and use	Cultural/social knowledge	Elaboration/Monitoring
8	Understand/acquire	Acquire skills observation/imitation	Elaboration/Monitoring
9	Personal growth	Cultural/social knowledge	Elaboration/Monitoring
10	Personal growth	Acquire skills by observation/ imitation	Organisation/Memory
11	Understand/acquire	Seeking information in areas of interest	Organisation/Memory
12	Understand/acquire	Acquire skills observation/imitation	Focusing/Rehearsal
13	Understand/acquire	Independent, active, problem solving	Focusing/Rehearsal
14	Acquisition/use knowledge	Acquire skills observation/imitation	Organisation/Memory
15	Understand/relate, elaborate, analyse	Acquire skills observation/imitation	Elaboration/Monitoring
16	Understand/relate, elaborate, analyse	Cultural/social knowledge	Organisation/Memory
17	Acquisition/use knowledge	Acquire skills observation/imitation	Organisation/Memory
18	Acquisition/use knowledge	Seeking information in areas of interest	Organisation/Memory
19	Understand/acquire	Independent, active, problem solving	Focusing/Rehearsal
20	Understand/acquire	Seeking information in areas of interest	Focusing/Rehearsal
21	Understand/acquire	Cultural/social knowledge	Focusing/Rehearsal
22	Understand/acquire	Cultural/social knowledge	Organisation/Memory

Conceptions of formal learning and learning strategies. Students were assigned to the level of strategy that they reported using the most. Figure 1 depicts the strategies that we believe should follow from the respective conceptions of formal learning. For example the conceptions of learning relating to *acquisition* of information may be achieved by using focusing/rehearsal strategies. The conceptions from *acquisition* to *understand, acquire, and use* may be achieved by employing organisation/memory strategies. The learning conceptions *understand, relate, elaborate* and *personal growth* would require elaboration and monitoring strategies.

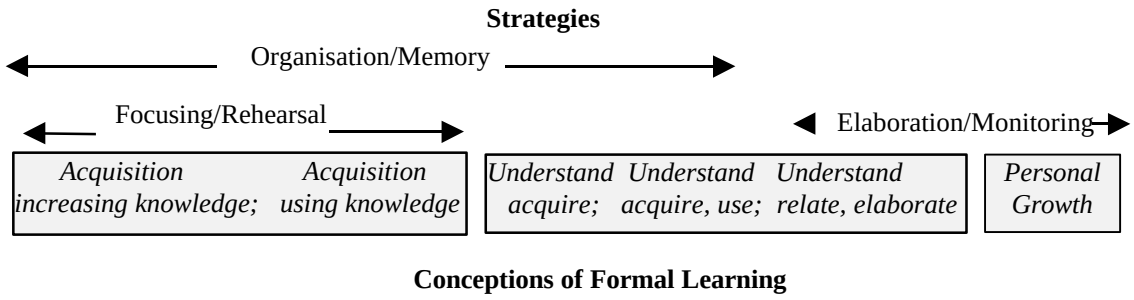

Figure 1. Conceptions of formal learning and associated strategies

Eleven students (1, 2, 7, 8, 10, 12, 13, 16, 19, 20, 21) reported using strategies that we believe did not match their conception of formal learning. To explain this we use student 2 as an example. Student 2 reported a conception of learning as *understand, relate and elaborate* but used strategies of focusing/rehearsal of information; such strategies would not necessarily lead to a relational understanding of information. Student 8 also exemplified a mismatch as learning was explained as to *understand and acquire* however elaboration and monitoring strategies were employed. Such high level strategies would not be required to simply understand and remember information. For eleven students (3, 4, 5, 6, 9, 11, 14, 15, 17, 18, 22) there was a match between their conception of formal learning and their predominant strategies.

Conceptions of formal learning and categories of informal learning. It could be argued that students' conceptions of formal learning should be in keeping with how they view informal learning even though the actual contexts of learning may be situation specific. Figure 2 depicts categories of informal learning that would be compatible with each conception of formal learning in terms of the cognitive processes that would be required to achieve each. For example we propose that the conceptions of formal learning relating to *acquisition* would be compatible with the informal learning category *acquiring skills by observation* and *transmission of information from elders*.

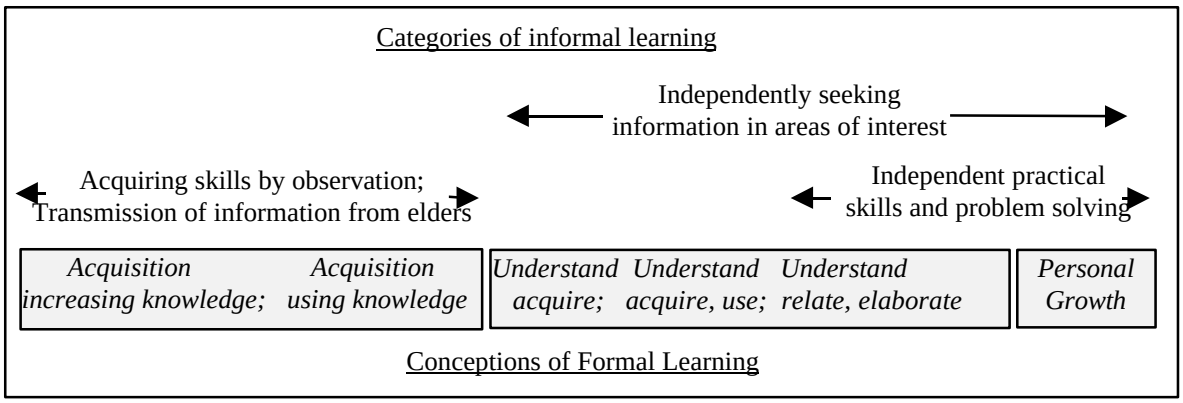

Figure 2. Conceptions of formal learning and informal learning categories

Only seven students had conceptions of formal learning that were compatible with their category of informal learning as evidenced by student 2 who held the conception of formal learning to *understand, relate and elaborate* and the category of informal learning *independently developing practical skills by active problem solving*. Students 3, 4, 11, 14, 17, and 20 also had conceptions of formal and categories of informal learning that

could be regarded as being consistent. However the other 15 students reported categories of informal learning that we consider to be incompatible with their conceptions of formal learning.

Discussion

This paper describes a sample of Aboriginal and Torres Strait Islander university students' conceptions of formal as well as their experiences of informal learning, reasons for studying and the strategies they used to learn. The main purpose of the study was to determine this group's conceptions of formal learning so that instructional techniques might be adapted to be more specific for the learning needs of such students and the high attrition rates of these students might be addressed. It became apparent that most students held quantitative conceptions of formal learning. This was evident in the conceptions of *acquiring knowledge, acquiring and using knowledge* and learning as *understanding, acquisition and use*. Qualitative dimensions were also evident when students reported that learning involved *understanding elaboration, analysis* and *personal growth*. While these conceptions are similar to those found by Marton et al. (1993) and Watkins and Akande (1994) they also differ in that there was a strong focus on learning as gaining understanding.

The students expressed three main reasons for studying which indicated not only a desire to improve themselves and to carry out further study but also aspirations to improve conditions for their own people. These reasons parallel the motivation to learn that McInerney (1991) found in Aboriginal school students; that is achieving a goal, improving their self-concept and intrinsic motivation. Studying to help their own people reflects the moral dimension to learning that Boulton-Lewis et al. (1997) found some Aboriginal university students possessed. The reasons also resemble Beaty et al's. (1997) orientations to study as follows: academic and to pursue further learning, vocational and job related, and personal and to improve as a person. Thus while there are cultural elements to this group's reasons for studying there are also parallels as one would expect between this group and other university students' reasons for studying.

The strategies that students reported using were similar to those identified by Weinstein and Mayer (1983) and the learning activities of Vermunt and Verloop (1999). Many strategies that were indicative of efforts to understand information were similar to those reported by the students in the study by Entwistle and Entwistle (1992) that investigated understanding. However while half of the students held conceptions of formal learning that were apparently consistent with the strategies they reported using to learn, half did not. The latter situation bears similarities to Schön's (1987) theory of "reflective practice". Schön found that even though students learn theoretical content within a course, when they come to actually work in practice they are often faced with problem situations in which the theory they have learnt is inadequate or does not fit the situation. This can result in 'theories-in-use' that are different from what has been learnt. Schön argued that the processes of 'knowing-in-action', that is knowing that is revealed in intelligent action such as instant analysis of a balance sheet (Schön, 1987), and 'theories-in-use' was achieved through 'reflection-in-action' which is personal modification and development of ideas by thinking and problem solving. He proposed that such reflective thinking can be encouraged through coaching. Thus if the students, such as those in this study, were encouraged to be reflective and to use strategies that were consistent with their conception of formal learning then this might help to promote more productive engagement with information.

For most students their perception of informal learning proved to be quite different from their conception of formal learning. While it is reasonable to expect that this might be the case, it is interesting that students hold such different views of learning based on its context and purpose. Many of the Aboriginal and Torres Strait Islander students reported categories of informal learning that focussed on acquisition of skills or cultural knowledge from respected elders and learning that was motivated by interest, development of practical skills, and the ability to problem solve. Students reported learning these skills largely by observation and imitation and by casual trial and error. This is similar to the means by which Harris (1984) found Aboriginal children learn in traditional settings, that is by observation and trial and error rather than by direct instruction. Informal learning that was expressed as involving family members or elders reflects the type of learning that Christie (1985) and Hughes (1987) found in traditionally oriented Aboriginal people. Most of the students in this study who stated that informal learning was acquiring skills by observation and imitation, or by acquiring cultural knowledge from family or elders, were from remote areas or rural country towns where the cultural influence was strong. However there were two students who grew up in capital cities who also held these perceptions. One stated that he grew up with a strong cultural influence and whilst the other experienced very little cultural influence she stated that her heritage was important to her.

The perceptions of informal learning reported by the Aboriginal and Torres Strait Islanders are similar to the informal learning strategies that Ninnes (1996) found for the people of the Western Province, Solomon Islands. These involved respect for elders, observation, imitation and trial and error. As we could not find any studies that related specifically to informal learning for other Australian university students, it was not possible to make comparisons with them however informal contexts has been investigated by Resnick (1987). Some of the characteristics she found were evident in the perceptions of informal learning reported by the Aboriginal and Torres Strait Islander students. For example she noted that outside school learning can incorporate tool manipulation which parallels the conception of developing practical skills by active problem solving. Thus while the Aboriginal and Torres Strait Islander students exhibit informal learning perceptions that would seem similar to those of others, there are also cultural dimensions to their informal learning.

Not all the Aboriginal and Torres Strait Islander students in this study reported contrasting views of formal and informal learning. Six students stated that they believed learning was evident in all aspects of life and that it was an everyday thing. However two of these students (8, 15) gave conceptions of formal learning and informal learning categories that were incompatible. Therefore even though these students stated that they regarded learning to be the same in either situation, this proved to be questionable. This may be a source of conflict for these students if they try to practise strategies that they use to learn in informal contexts, in a formal setting.

It could be construed that those students who reported compatible conceptions of formal learning and categories of informal learning hold an elementary ‘nondualist’ (Marton & Booth, 1997) perspective of learning. Marton and Booth explain a ‘dualist’ perspective as one in which it is believed that knowledge is individually constructed by a person through their own ‘inner’ consciousness or mental representations and socially constructed by events that take place in the ‘outer’ society through cultural practices, language, and other people. However Marton and Booth explain that individual constructivism and social constructivism are “mirror images” (p. 12) of each other and

that knowledge is gained by transcending this "person-world" (p. 12) dualism. In other words, they do not consider the world as separated into an inner consciousness and outer elements, rather they perceive the world as constituting an internal relation between these and consider this to be the world that we experience. They explain this as a nondualist perspective, stating that it constitutes an internal relation of the inner and outer as constructed and experienced by the learner. If a nondualist perspective, as apparently explained by some Aboriginal and Torres Strait Island students, could be fostered then formal learning outcomes might become more integrated. In other words to achieve effective formal learning it is necessary to actively manipulate ideas in the way that objects are manipulated in informal learning. Such processes would allow students to reconcile some of their informal approaches or strategies within a formal context. Further to this connections between formal and informal learning could be made which might encourage the development of a deeper, lifelong perspective of learning.

Conclusion

It is clear from the results of this study that these Aboriginal and Torres Strait Islander university students generally held conceptions of formal learning that were predominantly quantitative and similar to those of other university students (Marton, Dall'Alba & Beaty, 1993; Watkins & Akande, 1994). The students' reasons for studying were similar to those that Beaty, et al. (1997) found the Open University students held and the strategies they used were also like those used by other students (Vermunt & Verloop, 1999). Therefore one could argue that these students learn at university in much the same way as other students and as such it could be expected that their attrition rate should also be similar. Yet this is not the case. Perhaps this can be explained in part by the results of this study. Many students had conceptions of formal learning that were not in keeping with the strategies they used to learn. This is in direct contrast to the view proposed by Marton, Dall'Alba, and Beaty (1993) and Watkins (1996) that conceptions and approaches are closely related. When conceptions of formal learning do not match the strategies used to learn then students may experience cognitive conflict and this may result in difficulties with formal learning.

Students may also face difficulties in learning when their perceptions of informal learning do not complement their conceptions of formal learning. If students try to employ strategies that they find productive when learning in informal settings within a formal context then this too may result in cognitive conflict and unproductive learning experiences. It is possible that such situations could lead to students opting out of courses. Another reason for the high attrition rates for the Aboriginal and Torres Strait Islander students may be the influence of cultural factors on learning. Cultural factors were evident for the students in this study in their reasons for learning and their perceptions of informal learning. As stated earlier, not enough consideration is given to cultural elements in courses undertaken by indigenous students (Bourke, et al., 1996). This may be because the learning that occurs in higher education is structured in such a way that it does not rely on cultural elements such as observation and imitation or the development of Aboriginal and Torres Strait Islander cultural knowledge.

We believe that if university courses are to cater for specific learning needs of Aboriginal and Torres Strait Islander students there should be greater opportunity for interaction and active involvement as well as a certain degree of cultural focus. Additionally we concur with Anderson et al. (1998) when they state that universities need to recognise and value diversity among their students, they should respond to knowledge which all

students, including Indigenous students, bring with them to university, and they need to provide a range of support services for Indigenous students. We also believe that students must be helped to develop conceptions and strategies that will enable them to learn formal, theoretical material successfully. Additionally we believe there should be opportunities for learning in higher education that allow these students to integrate their informal and formal learning practices. This way students may be encouraged to develop a nondualist (Marton & Booth, 1997) approach and to view learning as an integrated and lifelong process. This may address in part what Hampton (1993) refers to as the institutional changes needed to improve tertiary educational persistence among Indigenous students.

We also feel that the results of this study call into question the processes which saw increased numbers of Indigenous students undertaking university courses in Australia since the 1980's. This occurred following a Commonwealth Government concern to raise participation of Indigenous students in Higher Education. Initiatives that followed included the provision of special entry for Indigenous students to Higher Education, the establishment of Indigenous study enclaves within universities, and conducting pre-tertiary orientation or preparation programs. We believe that while these initiatives have achieved their objective of increasing Indigenous participation in university courses, they have not sufficiently addressed their specific learning needs. The results of this study and the continued high attrition rate attest to this contention. In particular allowing Indigenous students special entry to university courses when they do not have prerequisite study skills or knowledge and when they view learning as acquiring information, as many of the students in this study stated, or they simply do not know how to go about learning, would seem to be an unsubstantiated and dubious practice.

This study presented a description of conceptions of learning and related matters for a sample of Aboriginal and Torres Strait Islander students and therefore it is hoped it will contribute to future directions in educational endeavours and practices for these students. As stated earlier, conceptions of formal learning have been investigated for students in many countries and there is a growing body of knowledge in regard to perceptions of informal learning held by students. However there have been very few studies that incorporate both these factors as well as reasons for studying and strategies used to learn. In order to develop models of education that take into account a more comprehensive view of student learning, future research could investigate all of these areas. It may also be fruitful if such research encompassed diverse cultural groups such as occurred in this study.

References

Anderson, L., Singh, M., Stehbens, C., & Ryerson, L. (1998). *Equity issues: Every university's concern, whose business? An exploration of universities' inclusion of indigenous peoples' rights and interests*, DEETYA, Canberra.

Australian Bureau of Statistics and Australian Institute of Health and Welfare. (1997). *Indigenous identification in administrative data collections - best practice and quality assurance*. Report on proceedings of the Brisbane Workshop, November, 1996. Canberra: Commonwealth of Australia.

Beaty, L., Gibbs, G., & Morgan, A. (1997). Learning orientations and study contracts. In F. Marton, D, Hounsell & N. Entwistle (Eds.), *The experience of learning: Implications for teaching and studying in higher education* (pp. 72-86). Edinburgh: Scottish Academic Press.

Boulton-Lewis, G. M., Neill, H., & Halford, G. S. (1986). Information processing and scholastic achievement in Aboriginal Australian children in south east Queensland. *The Aboriginal Child at School*, *14*(5), 42-55.

Boulton-Lewis, G. M., Neill, H., & Halford, G. S. (1987). Information processing and mathematical knowledge in Aboriginal Australian children in south east Queensland. *Australian Aboriginal Studies, 2*, 63-65.

Boulton-Lewis, G. M, Marton, F., & Lewis, D. (1997). Conceptions of learning held by Aboriginal students in a tertiary program in Indigenous primary health care. In R. Murray-Harvey & H. C. Silins, (Eds.) *Learning and teaching in higher education: Advancing international perspectives, Proceedings of the Higher Education Research & Development Society of Australasia Conference* (pp. 23-36). Adelaide South Australia, 8-11 July 1997.

Bourke, C.J., Burden, J., & Moore, S. (1996). *Factors affecting performance of Aboriginal and Torres Strait Islander Students at Australian universities: A case study*. ACPS, Canberra.

Christie, M. J. (1985). *Aboriginal perspectives on experience and learning: The role of language in Aboriginal education.* Victoria: Deakin University Press.

Davidson, G., & Freebody, P. (1986). Children and adults or novices and experts. *Australian Journal of Psychology, 38*, 215-219.

Entwistle, A., & Entwistle, N. (1992). Experiences of understanding in revising for degree examinations. *Learning and Instruction, 2*, 1-22.

Gibson, S. (1993). Culture and learning: A divisive link. *The Aboriginal Child at School, 21*(3), 43-51.

Hampton, E. (1993). Towards a redefinition of American Indian/Alaskan native education. *Canadian Journal of Native Education*, *20*(2), 261-309.

Harris, S. (1984). Aboriginal learning styles and formal schooling. *The Aboriginal Child at School, 12*(4), 3-23.

Harvey, B., & McGinty, S. (1988). *Learning my way*. Papers from the National conference on adult Aboriginal learning, WACAE.

Hatano, G., & Miyake, N. (1991). What does a cultural approach offer to research on learning? *Learning and Instruction, 1*, 273-281.

Heath, S.B. (1991). "It's about winning!" The language of knowledge in baseball. In L.B. Resnick, J.M. Levine, & S. Teasley (Eds.), *Perspective on socially shared cognition*, (pp. 101-124). Washington: American Psychological Association.

Hughes, P. (1987). *Aboriginal culture and learning styles - A challenge for academics in Higher Education institutions.* Publications Office, University of New England.

Johansson, B., Marton, F., & Svensson, L. (1985). An approach to describing learning as a change between qualitatively different conceptions. In L.H.T. West & A.L. Pines (Eds.). *Cognitive structure and conceptual change*. New York: Academic Press.

Kearins, J. (1981). Visual spatial memory in Australian Aboriginal children of desert regions. *Cognitive Psychology, 13,* 436-460.

Klich, L. Z., & Davidson, G. R. (1984). Toward a recognition of Australian Aboriginal competence in cognitive functions. In J. R. Kirby (Ed.), *Cognitive strategies and educational performance* (pp. 155-202), Orlando, Florida: Academic Press.

McInerney, D. M. (1991). Key determinants of motivation of non-traditional Aboriginal students in school settings: Recommendations for educational change. *Australian Journal of Education, 35*(2), 154-174.

Marton, F. (1994). Phenomenography. In T. Huson & T. N. Postlethwaite (Eds), *The international encyclopedia of education,* 2nd Edition, Vol. 8, (pp. 4424-4429). Oxford: Pergamon Press.

Marton, F., & Booth, S. (1997). *Learning and awareness*. Mahwah, N.J: L. Erlbaum Associates.

Marton, F., Dall'Alba, G., & Beaty, E. (1993). Conceptions of learning. *International Journal of Educational Research, 19*, 277-300.

Ninnes, P. (1996). *Informal learning strategies in the Solomon Islands*. Educational and Professional Studies, School of Education. Social Science South Building. Flinders University, Australia. http/wings.buffalo.edu/anthropology/JWA/VIN3/ninnes-art.html

Nugent, M. (1992). *Adult basic education principles to access Aboriginal students to tertiary education*. Paper presented at the ACAL National Conference, Sydney.

Queensland University of Technology. (1995). *Course attrition index, 1994*. Planning and Statistics Section, Department of Planning and Budget, Bulletin Number 95/6.

Resnick, L. (1987). The 1987 Presidential address: Learning in school and out. *Educational Researcher, December*, 13-20.

Resnick, L. (1991). Shared cognition: Thinking as social practice. In L.B. Resnick, J.M. Levine, & S. Teasely (Eds.) *Perspectives on socially shared cognition,* (pp. 1-10). Washington D.C.: American Psychological Association.

Säljö, R. (1979). Learning in the learner's perspective. Some common-sense conceptions. *Reports from the Department of Education, University of Göteborg,* No. 76.

Schön, D.A. (1987). *Educating the reflective practitioner*. London: Jossey-Bass Publishers.

Triandis, H.C. (1972). *The analysis of subjective culture*. New York: Wiley.

Tynjälä, P. (1997). Developing education students' conceptions of the learning process in different learning environments. *Learning and Instruction, 7*(3), 277-292.

Vermunt, J.D., & Verloop, N. (1999). Congruence and friction between learning and teaching. *Learning and Instruction, 9*, 257-280.

Watkins, D. (1996). Hong Kong secondary school learners: A developmental perspective. In D. Watkins & J. Biggs (Eds.), *The Chinese learner: Cultural, psychological and contextual Influences* (pp. 107-119). Melbourne: The Australian Council for Educational Research Ltd.

Watkins, D., & Akande, A. (1994). Approaches to learning of Nigerian secondary school children: Emic and etic perspectives. *International Journal of Psychology, 29*(2), 165-182.

Weinstein, C.E., & MacDonald, J.D. (1986). Why does a school psychologist need to know about learning strategies? *Journal of School Psychology, 24*, 257-265.

Weinstein, C.E., & Mayer, R.E. (1983). The teaching of learning strategies. *Innovation Abstracts*, 5(32). (ERIC Document No. 237 180).

Wen, Q., & Marton, F. (1993). Chinese views on the relation between memorisation and understanding. Paper presented at the *Fifth European Association for Research on Learning and Instruction Conference in Aix en Provence*, August 31-September 5.